

Serial Number 09/495,597

PU020209

-2-

Listing and Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (previously presented) A method of generating a normalized bitmap representation of the shape of a visual object in an image comprising the steps of:
 - segmenting the image to generate a segmentation map of visual objects;
 - identifying samples from the segmentation map belonging to a visual object of interest;
 - identifying the largest connected blob to form an un-normalized bitmap;
 - and
 - normalizing the un-normalized bitmap to form a normalized bitmap representation, wherein said normalizing step additionally comprises the steps of:
 - estimating a mean and covariance for each valid sample in the un-normalized bitmap;
 - computing a principal direction for the un-normalized bitmap based upon the mean and covariance as eigenvectors of a covariance matrix; and
 - back projecting the un-normalized bitmap as a function of the mean and eigenvectors to normalize the un-normalized bitmap for translation, rotation and scale so that after normalization the normalized bitmap representation has a standard height and is oriented such that the principal direction is along a vertical direction.
2. (original) The method as recited in claim 1 further comprising the step of searching a database of images, each image having associated visual objects with normalized bitmap representations, in response to a query specifying a desired normalized bitmap representation to identify a plurality of visual objects having normalized bitmap representations that closely match the desired normalized bitmap representation.

Serial Number 09/495,597

PU020209

-3-

3. (cancelled)

4. (original) The method as recited in claim 2 wherein the searching step comprises the steps of:

- providing a query bitmap seeking similarly shaped visual objects from the database;

- normalizing the query bitmap;

- obtaining various mirror versions of the normalized query bitmap;

- for each normalized bitmap representation in the database compute a mismatch value with the normalized query bitmap; and

- identifying the visual objects having normalized bitmap representations with low mismatch values.

5. (original) The method as recited in claim 2 wherein the searching step comprises the steps of:

- providing a query bitmap to find visual object in the database having a similar aspect ratio;

- normalizing the query bitmap;

- computing a query aspect ratio for the normalized query bitmap;

- computing an aspect ratio for each normalized bitmap representation in the database;

- obtaining an absolute difference between the aspect ratios for each normalized bitmap representation and the query aspect ratio; and

- identifying the visual objects where the absolute difference has low values.

Serial Number 09/495,597

PU020209

-4-

6. (original) The method as recited in claim 2 wherein the searching step comprises the steps of:

providing a query bitmap to find visual objects with a similar density of valid samples;

computing a query density of valid samples for the query bitmap;

computing a density for each normalized bitmap representation in the database;

obtaining an absolute difference between the density for each normalized bitmap representation and the query density; and

identifying the visual objects where the absolute difference is low.

7. (cancelled)

8. (cancelled)

9. (currently amended) A method of generating a normalized bitmap representation of the shape of a visual object in an image comprising the steps of:

segmenting the image to generate a segmentation map of visual objects;

identifying samples from the segmentation map belonging to a visual object of interest;

identifying the largest connected blob to form an un-normalized bitmap; and

normalizing the un-normalized bitmap to form a normalized bitmap representation, wherein said normalizing step comprises a normalization operation that is at least one of: adjusting a translational parameter corresponding to the un-normalized bitmap and adjusting a rotational parameter corresponding to the un-normalized bitmap, where the result of said normalization operations enables the normalized image to be compared to other normalized images, wherein the searching step comprises the steps of:

providing a query bitmap seeking similarly shaped visual objects from a database;

Serial Number 09/495,597

PU020209

-5-

normalizing the query bitmap;
obtaining various mirror versions of the normalized query bitmap;
for each normalized bitmap representation in the database compute a
mismatch value with the normalized query bitmap; and
identifying the visual objects having normalized bitmap representations with low
mismatch values.

10. (cancelled)

11. (previously presented) The method as recited in claim 9 further comprising the step of searching a database of images, each image having associated visual objects with normalized bitmap representations, in response to a query specifying a desired normalized bitmap representation to identify a plurality of visual objects having normalized bitmap representations that closely match the desired normalized bitmap representation.

12. (cancelled)

13. (cancelled)

14. (cancelled)